VT 2200

SERVICE MANUAL

INTRODUCTION

This manual explains only the features of the N850 (C224 model) that are different compared with the VT2000 series (C211, C212 and C213 models). So, please refer to the VT2000 series service manual for the sections which are not described in this manual.

The N850 (C224 model) has been designed based on the N865 (C216 model), and some descriptions are the same as the N865 service manual.

SECTION 1

OVERALL MACHINE INFORMATION

1. SPECIFICATIONS

Configuration:	Desktop
Master processing:	Digital
Printing process:	Full automatic one-drum stencil system
Original type:	Sheet
Original size:	Maximum 307 mm x 432 mm (12.0" x 17.0") Minimum 90 mm x 140 mm (3.6" x 5.5")

Reproduction ratios:

	LT Version	A4 Version
Full Size	100%	100%
Reduction	93%	93%
	75%	82%
	64%	71%

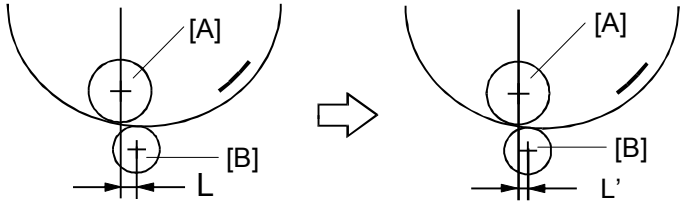
Image mode:	Line/Photo
Color printing:	Drum unit replacement system
Master feed/eject:	Roll master automatic feed/eject
Printing area:	Maximum: 250 mm x 355 mm (9.8" x 13.9") at 20°C/ 65 % RH.
Leading edge margin:	5 ± 3 mm at the "0" position
Print paper size:	Minimum: 90 mm x 148 mm (3.6" x 5.8") Maximum: 325 mm x 447 mm (12.7" x 17.5")
Print paper weight:	47.1 g/m^2 to 209.3 g/m^2 (12.5 lb to 55.6 lb)
Printing speed:	60, 75, 90, 105, 120 sheets/minute (5 steps)
First copy time:	Less than 35 seconds (B4) Less than 32 seconds (A4)
Second copy time:	Less than 38 seconds (B4) Less than 35 seconds (A4)
Paper feed table capacity:	1000 sheets (66.3 g/m^2 /17.6 lb)
Paper delivery table capacity:	500 sheets (66.3 g/m^2 / 17.6 lb)

Power source:	110/120 V, 60 Hz	4.5 A
	220/240 V, 50/60 Hz	2.7 A

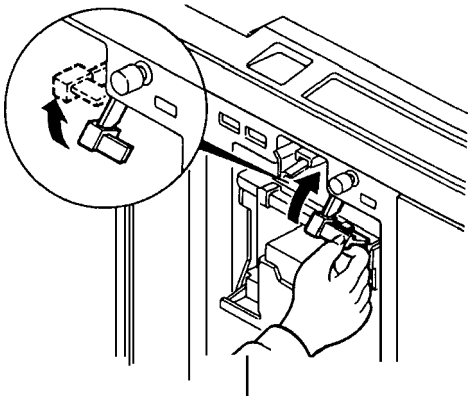
Maximum power consumption:	110/120 V version: 280 W 220/240 V version: 280 W	
Weight:	97kg (213.6 lb)	
Dimensions: (W x D x H)	Trays closed: 735 mm x 607 mm x 577 mm (28.9" x 23.9" x 22.7") Trays open: 1279 mm x 607 mm x 656 mm (50.4" x 23.9" x 25.9")	
ADF original capacity:	20 sheets (66 g/m^2) or 1.8 mm height	
Original guide width settings:	98 mm to 316 mm (38.6" to 12.44")	
Original scanning time:	2.5 ms/line	
Original thickness:	0.05 mm to 0.8 mm	
Original feed speed:	21.2 mm/second (When master processing) 33.9 mm/second (When not master processing)	
Pixel density:	300 dots/inch	
Master eject box capacity:	70 masters (Normal condition) 60 masters (10°C/30% RH Condition)	
Paper feeding:	Friction roller/center separation system	
Feed table side plate width settings:	88 mm to 330 mm (3.46" to 12.99")	
Paper feed roller pressure:	Normal position Thick paper position	300 g 400 g
Separation roller pressure:	Normal position Weak position	180 g 70 g
Side registration:	± 10 mm (manual)	
Vertical registration:	± 20 mm (mechanical)	
Ink supply:	Automatic ink supply system	
Press roller pressure:	10 ± 0.3 kg	
Paper delivery:	Air knife/vacuum delivery	
Delivery side plate width settings:	90 mm to 320 mm (3.54" to 12.6")	
Print counter:	7 digits	

Master counter:	6 digits	
Supplies:	Thermal master	280 mm width
Priport Master VT- II - M: (300 dots/inch)		
	Master roll	257 masters/roll
	Roll diameter	130 mm
	Master length	480 mm/master
	Max run length	2000 prints
Ink colors: (600 ml/pack)	Black, Red, Blue, Green, Brown Yellow, Purple, Navy, Maroon	

2. ESSENTIAL DIFFERENCES BETWEEN C211/C212/C213 AND C224 MODELS

<table>
<tr><th>No.</th><th>Item</th><th>Remarks</th></tr>
<tr><td>1.</td><td>CCD</td><td>A CCD which corresponds to 300 dpi pixel density is used.
<table>
<tr><td>Number of Effective Pixels:</td><td>3648 pixels</td></tr>
<tr><td>Reading Length:</td><td>309 mm</td></tr>
<tr><td>Photo Signal Storage:</td><td>2.5 ms</td></tr>
</table></td></tr>
<tr><td>2.</td><td>Thermal Head</td><td>The thermal head and thermal head drive circuit have been changed corresponding to the 300 dpi pixel density and the increased master feed speed.
<table>
<tr><td>Density of thermal heating elements</td><td>300 dots/inch</td></tr>
<tr><td>Number of thermal heating elements</td><td>3072 dots</td></tr>
<tr><td>Memory length</td><td>256 mm</td></tr>
</table></td></tr>
<tr><td>3.</td><td>Drum Ink Roller Layout</td><td>To ensure paper separation from the drum, the ink roller has been shifted towards the paper feed table.
The distance L has been changed from 5.0 mm to 3.5 mm (same as the C216 model).
C211 model C224 model
 

L = 5.0 mm L' = 3.5 mm
NOTE: The optional color drum for the C224 model is commonly used for the C211 model. (The distance L for the color drum is 4.5 mm.)</td></tr>
</table>

No.	Item	Remarks
4.	Drum Connector	To ensure drum connection, a drum lock lever has been added inside the front door. To remove the drum from the machine, the drum release lever must be pulled up to disconnect the drum connector. (Same as the C216 model.) 
5.	Ink Detection Board	The location of the ink detection board has been changed from the upper side to the right side of the drum shaft. The ink type switch (SW901), which was not used (always set at oil type), has been removed. (Same as the C216 model.)
6.	Drum Shaft	To supply ink to the ink roller evenly, the second ink supply hole (count from the front side) of the drum shaft is covered with a strip of tape. (Same as the C216 model.)
7.	Exit Pawl Air Pump	To ensure paper separation from the drum, the exit pawl air pump system is standardized. (Same as the C216 model.) (The pump system can optionally be installed in models of the C211 series.)
8.	Main Board and Image Processing Board	The main board and the image processing board have been combined into one board.
9.	Thermal Head Drive	The thermal head drive board has been removed. The function of the board has been moved to the main board. The thermal head voltage is directly applied from the power supply unit. The main board applies the signal to the PSU to supply thermal head voltage only during the master making process. (Same as the C216 model.)
12.	Paper Table Drive Motor	The paper table drive motor has been changed from an ac motor to a dc motor.
13.	Air Knife Motor	The air knife motor has been changed from an ac motor to a dc motor.
14.	Pressure Plate Position Sensors	The pressure plate position switch and the full master detecting switch have been eliminated. Three photo-interrupters, upper and lower pressure plate sensors and full master box sensor are used instead.

No.	Item	Remarks
15.	Pressure Plate Motor	The master eject motor which had two functions: (one is to drive the exit rollers, the other is to drive the pressure plate) has been replaced by two motors; the master eject motor and pressure plate motor. Due to this modification, the master box capacity has been increased.
16	Skip Feed	A user can select from 2 to 9 rotations of the drum while one sheet of paper is fed.
17.	Economy Function (New Function)	If "Economy mode" is selected on the operation panel, a lower thermal head energy is applied when a master is made. As a result, the image will be lighter than normal and ink consumption will be less.
18.	Security Mode (New Function)	"Secret mode" can be selected by changing DIP SW103-6. If this mode is selected, the Print key is disabled after turning the main switch off and on. (Only the "Master making key" is available.)

3. ELECTRICAL COMPONENT DESCRIPTIONS

INDEX No.	NAME	FUNCTION
Motors		
1	Main Motor	Drives paper feed, drum, printing and paper delivery unit components.
4	Vacuum Motor	Provides suction so that paper is held firmly on the transport belt.
7	ADF Drive Motor	Feeds the original to the original transport section.
12	Original Transport Motor	Transports the original to the scanner section.
20	Master Feed Motor	Feeds the master to the drum.
22	Pressure Plate Motor	Raises and lowers the pressure plate.
26	Air Knife Motor	Rotates the fan to provide air to separate the paper leading edge from the drum.
28	Master Eject Motor	Sends used masters into the master eject box.
33	Cutter Motor	Cuts the master.
60	Image Shift Motor	Changes the timing between the paper feed roller and the drum to adjust the vertical image position.
64	Paper Table Drive Motor	Raises and lowers the paper table.
Solenoids		
11	Original Pressure Solenoid	Presses the original pressure plate down on the originals.
21	Ink Supply Solenoid	Releases the spring clutch to activate the ink supply pump.
29	Master Eject Solenoid	Opens the master clamp to eject the master.
51	Paper Feed Solenoid	Releases the paper feed sector gear to rotate the paper feed roller.
52	Printing Pressure Solenoid	Moves the press roller against the drum.
56	Master Eject Clamper Solenoid	Opens the master clamp to eject the master.
58	Drum Lock Solenoid	Prevents removal of the drum unit when the drum is not at the home position.
59	Master Feed Clamper Solenoid	Opens the master clamp to eject the master.
Switches		
6	Printing Density Switch	Use to select the printing density corresponding to the type and quality of the original.
14	ADF Safety Switch	Check whether the ADF unit is set correctly or not.
18	Fluorescent Lamp Safety Switch	Cuts the power for the fluorescent lamp when the scanner is opened.
19	Left Cutter Switch	Detects when the cutter position is at the far left.
27	Master Eject Box Switch	Checks whether the master eject box is installed correctly or not.
32	Right Cutter Switch	Detects when the cutter position is at the far right.

INDEX No.	NAME	FUNCTION
37	Front Door Safety Switch	Checks whether the front door is set correctly or not.
38	Drum Safety Switch	Checks whether the drum unit is set correctly or not.
41	Paper Table Safety Switch	Checks whether the paper table is opened or not.
47	Test Switch	Releases the cover safety functions. (NOTE:)
48	Main Switch	Turns the power on or off.
49	Master Eject Unit Safety Switch (220V machines only)	Checks whether the master eject unit is closed correctly or not. Cuts the ac power.
55	Master Eject Unit Safety Switch (115V machines only)	
62	Master Cutter Switch	Informs the CPU to cut the master paper leading edge.
65	Drum Rotation Switch	Informs the CPU to rotate the main motor at 10 rpm.
Sensors		
3	1st Paper Exit Sensor	Detects misfeeds.
5	2nd Paper Exit Sensor	Detects misfeeds.
9	Original Registration Sensor	Detects misfeeds in the ADF, and synchronizes master feed with original feed.
10	2nd Original Sensor	Detects when the original comes to the feed position.
13	1st Original Sensor	Detects when the original is set in the ADF mode.
23	Lower Pressure Plate Sensor	Informs the CPU if the pressure plate is at the lower limit position.
24	Full Master Box Sensor	Informs the CPU if the master eject box is full of used masters.
25	Upper Pressure Plate Sensor	Informs the CPU if the pressure plate is at the upper limit position.
30	Master Eject Sensor	Detects master eject jams.
34	Master Buckle Sensor	Detects master buckling.
35	Master End Sensor	Informs the CPU when the plotter unit runs out of master roll.
40	Paper Table Height Sensor	Detects when the paper table reaches the paper feed position.
42	Paper Table Lower Limit Sensor	Detects when the paper table reaches the lowest position.
43	Printing Pressure Sensor	Informs the CPU when printing pressure is applied.
44	Paper End Sensor	Informs the CPU when the paper table runs out of paper.
50	Drum Rotation Sensor	Supplies timing pulses to the main board.
53	2nd Drum Position Sensor	Checks the position of the drum.
57	1st Drum Position Sensor	Checks the position of the drum.
Printer Circuit Board		
16	CCD PCB	Converts light into an electrical signal.
17	A/D Conversion PCB	Converts analog signals into digital signals.
39	Main Control PCB	Controls all machine functions both directly and through other boards.
54	Ink Detection PCB	Checks if the ink is present in the drum.

INDEX No.	NAME	FUNCTION
63	Power Supply PCB	Rectifies 100 V ac input and supplies dc voltage.
Counters		
45	Copy Counter	Keeps track of the total number of copies made.
46	Master Counter	Keeps track of the total number of masters made.
Others		
2	Transformer	Steps down the wall voltage.
8	Fluorescent Lamp	Exposes the original.
15	Fluorescent Lamp Stabilizer	Controls the exposure lamp.
31	Reverse Roller Clutch	Transfers master feed motor rotation to the reverse roller at proper timing.
36	Thermal Head	Burns the image onto the master.
61	Encoder	Converts 16 image positions to 4 bit data.
66	Operation Panel	Interfaces the CPU and the operator.

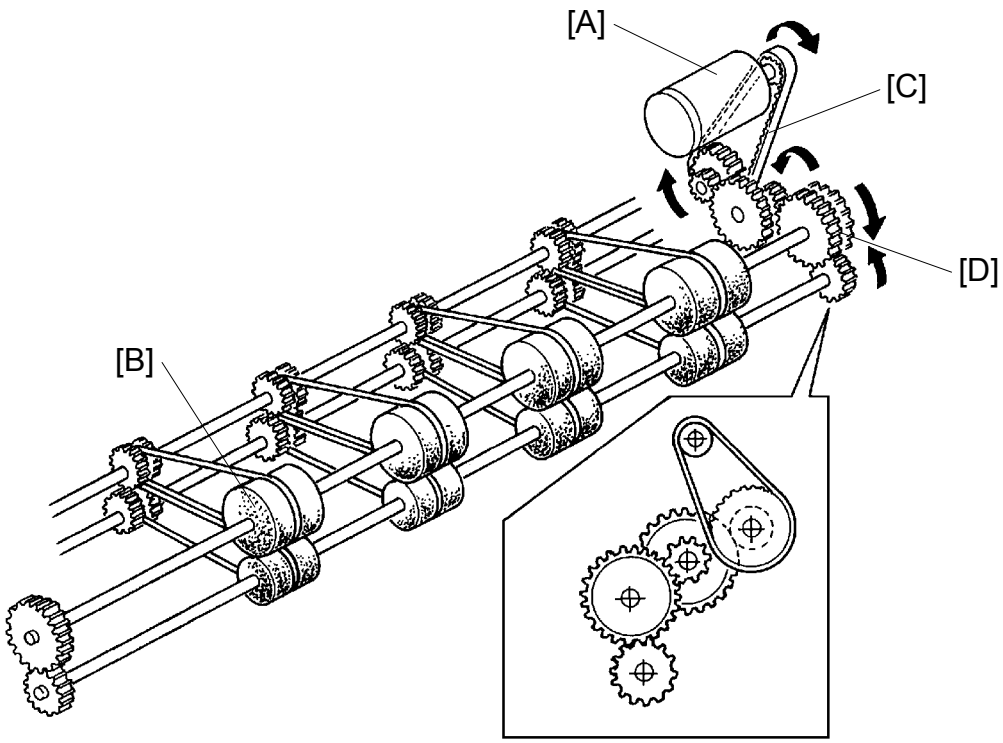
NOTE: The Master Eject Unit Safety Switch in the 220 V machines cannot be disabled by this test switch.

SECTION 2

DETAILED DESCRIPTIONS

1. MASTER EJECT SECTION

1.1 MASTER EJECT ROLLER DRIVE MECHANISM



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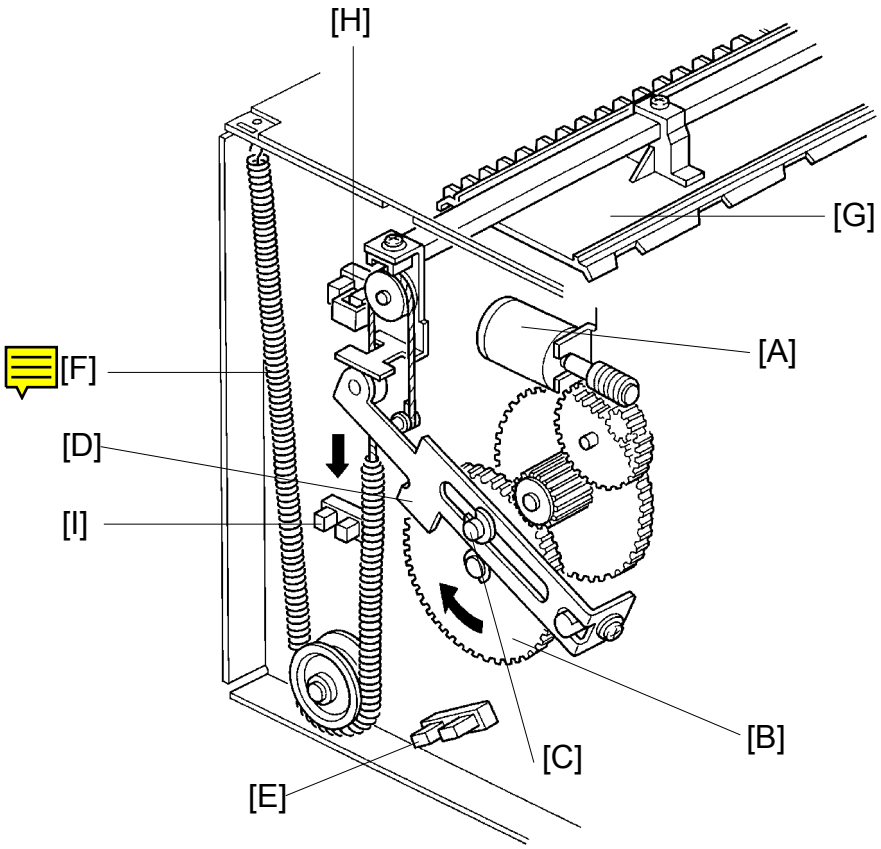
A dc motor [A] installed in the rear of the machine drives the master eject rollers [B] through a timing belt [C] and gears [D] to eject used masters. The master is transported between the upper and lower master eject rollers to be ejected to the master eject box.

1.2 PRESSURE PLATE UP/DOWN MECHANISM



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After the used master is transported to the master eject box, the master is compressed by the pressure plate.

The pressure plate is driven by an independent dc motor. The pressure plate motor [A] drive is transmitted to the gear [B] through gears, and the pin [C] moves link [D] down until the lower pressure plate sensor [E] is actuated. Spring [F] pulls down on the pressure plate [G] and the ejected master in the master eject box is compressed. Then the pressure plate motor stays off until the master making process is finished. Then the pressure plate motor starts again to return the pressure plate to the upper position. The motor stops when the upper pressure plate sensor [H] is actuated.

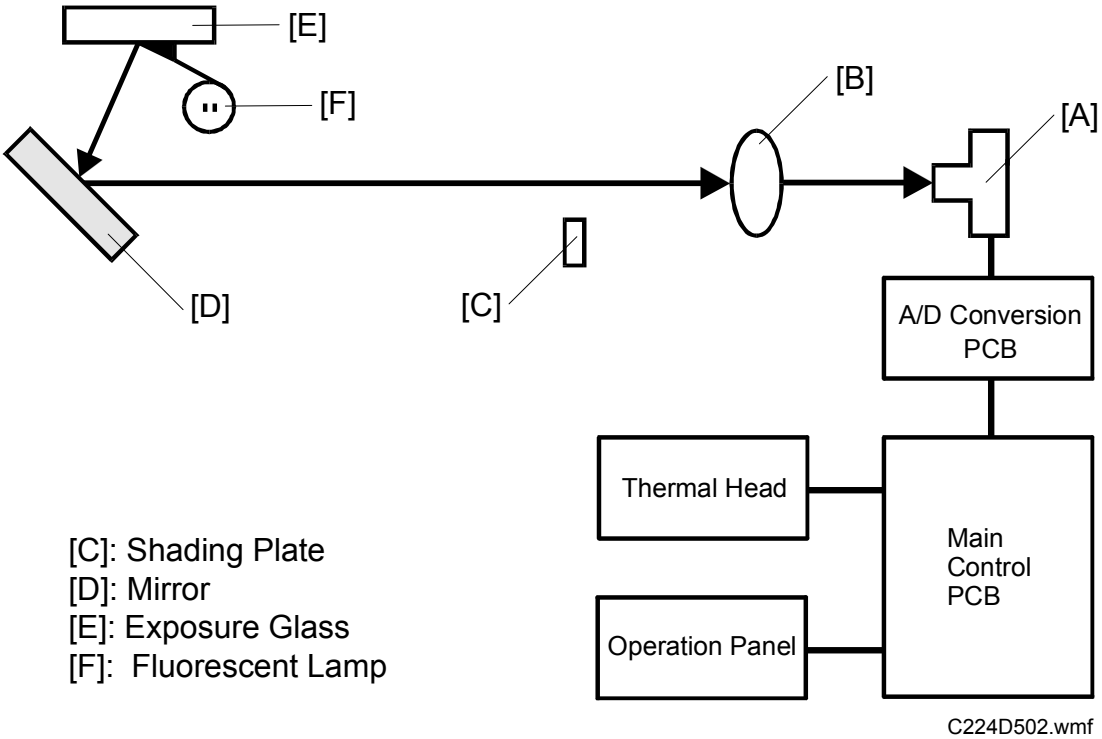
The machine detects that the master box is full if the full master box sensor [I] is not actuated when the pressure plate goes down.

2. OPTICS

2.1 OVERALL

The CCD [A] which corresponds to a 300 dpi pixel density is used for the C224 model.

Light reflected from the original goes to the CCD through a lens.
The CCD changes the light into an analog electrical signal which is changed to 4-bit digital data in the A/D conversion PCB. The main control PCB changes the 4-bit data into 1-bit data to drive the thermal head.



[C]: Shading Plate
[D]: Mirror
[E]: Exposure Glass
[F]: Fluorescent Lamp

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2.2 THERMAL HEAD

(1) Specifications

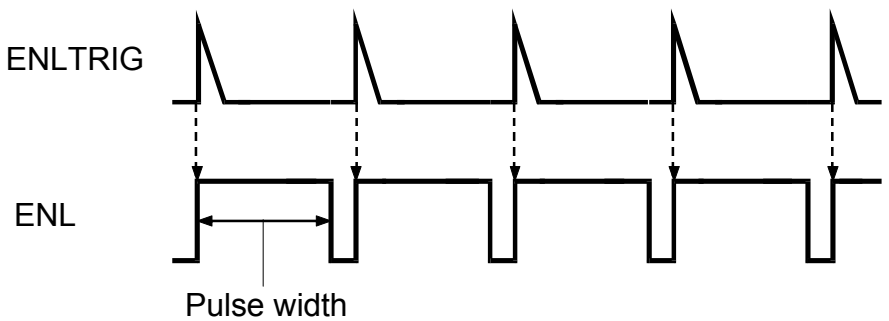
The C224 model uses a 300 dpi thermal head.

Thermal head

- Width 256 mm
- Number of thermal head elements 3072 dots
- Density of thermal head elements 300 dpi

(2) Thermal Head Control

The PSU applies thermal head voltage which is adjusted in the factory to match individual thermal head characteristics. The main control PCB controls the thermal head to reproduce the image on the master.



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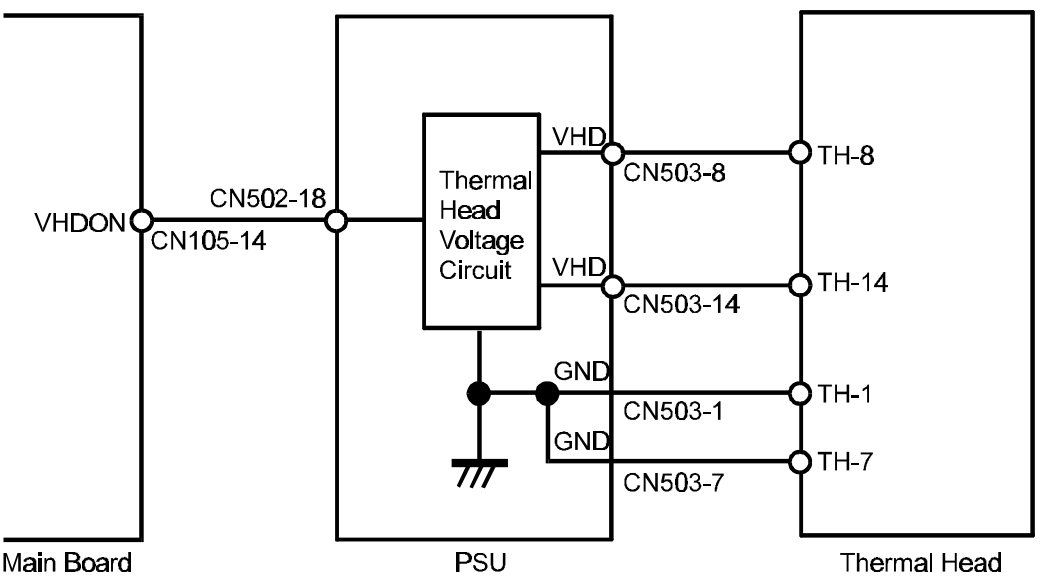
The thermal head energy is controlled by changing the pulse width.
The pulse is controlled by the ENL signal from the main board corresponding to ENLTRIG from the image processing board.



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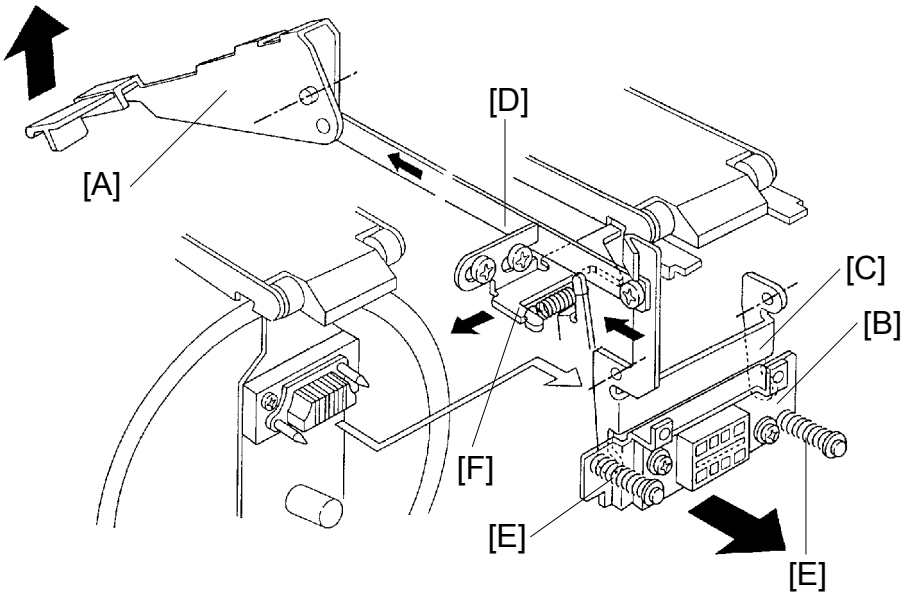
Thermal head voltage is applied from the PSU only during the master making process. This is controlled by the VHDON signal (CN105-14) from the main board.

3. DRUM

3.1 DRUM CONNECTION MECHANISM



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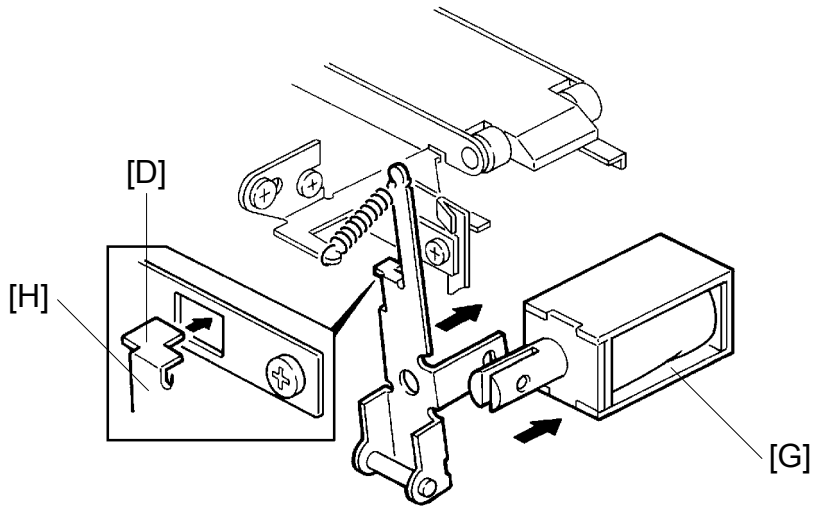

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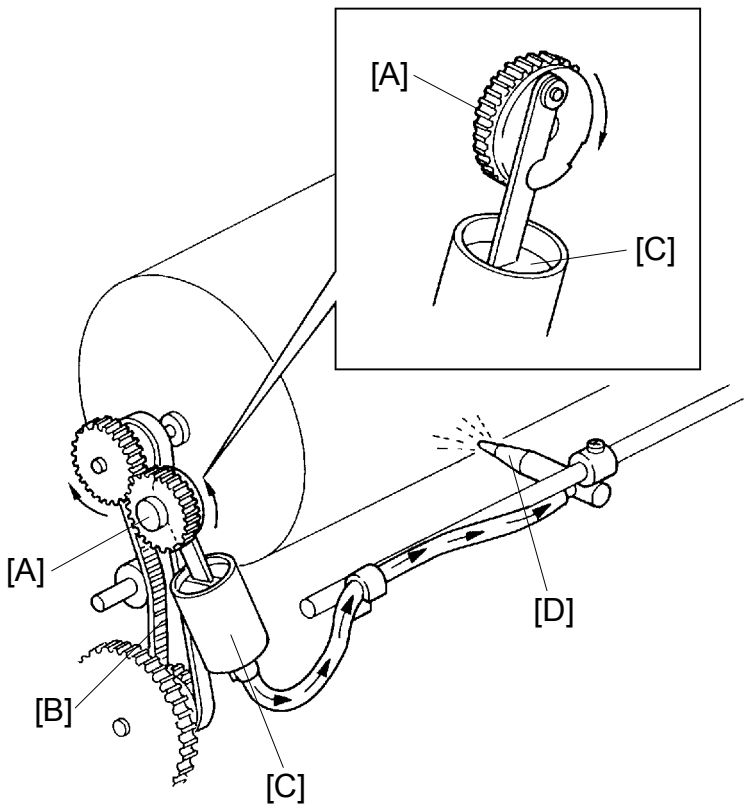
When the drum release lever [A] in front of the machine is raised, the connector [B] is pushed away from the drum by the bracket [C] through the link [D], and is thus disconnected. The connector moves only horizontally due to the guidance of the shafts [E]. The bracket [C] also pushes the drum lock lever [F] to release the drum lock allowing the drum to be removed.
While the drum is out of home position, the drum lock solenoid [G] is energized and the stopper [H] locks the link [D] so that it will not be pulled. The solenoid is de-energized when the drum stops at the home position (when the 1st drum home position sensor is actuated).

4. PAPER DELIVERY

4.1 EXIT PAWL AIR PUMP MECHANISM



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The main motor drive is transmitted to the pump gear [A] through gears and a timing belt [B]. The gear [A] rotates and drives the piston [C] back and forth.

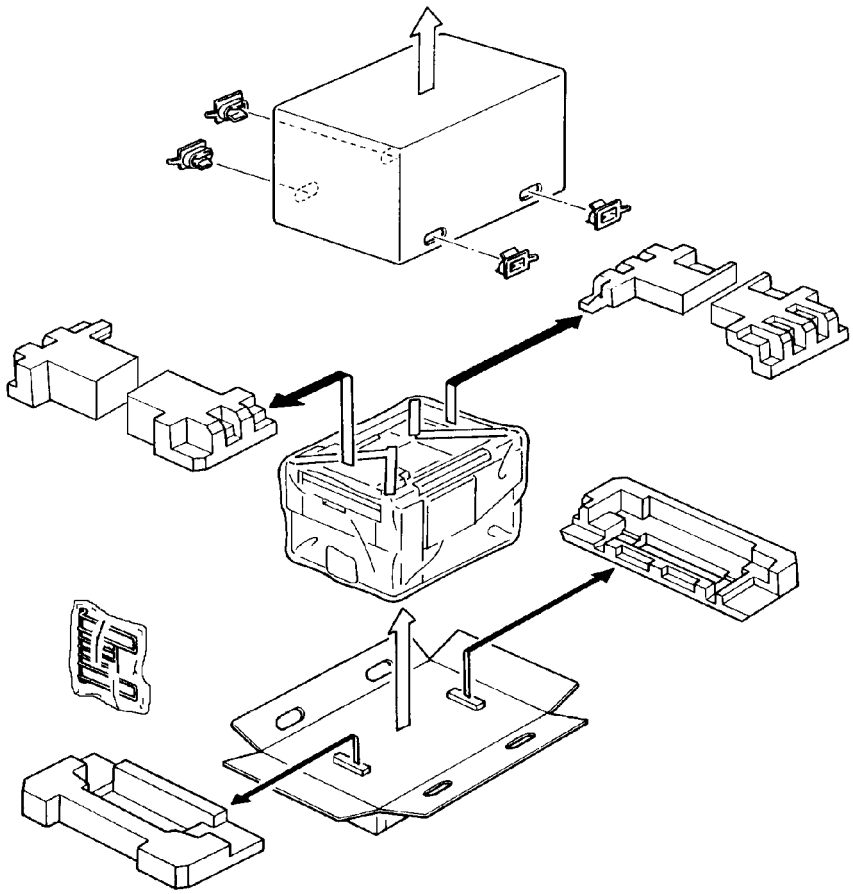
The piston moves forward and pushes a jet of air out through the nozzle [D]. This jet of air helps to separate the paper from the drum.

SECTION 3

INSTALLATION

NOTE: THE MACHINE MUST BE INSTALLED BY A CUSTOMER SERVICE REPRESENTATIVE WHO HAS COMPLETED THE TRAINING COURSES ON THIS MACHINE

1. INSTALLATION PROCEDURE



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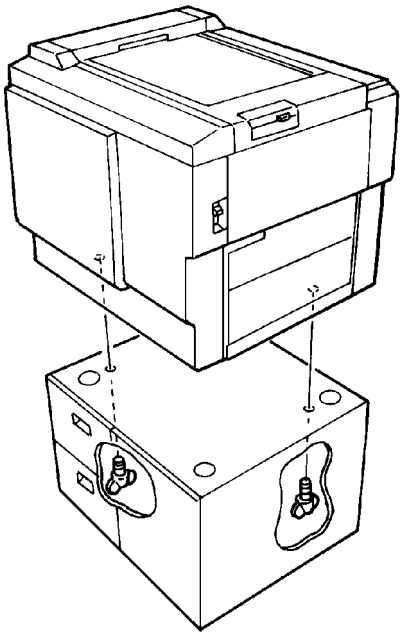
1. Make sure that you have all the accessories listed below.

(1) Original Exit Tray..... 1
(2) Operating Instructions (USA and Asia version only)..... 1
(3) NECR 1



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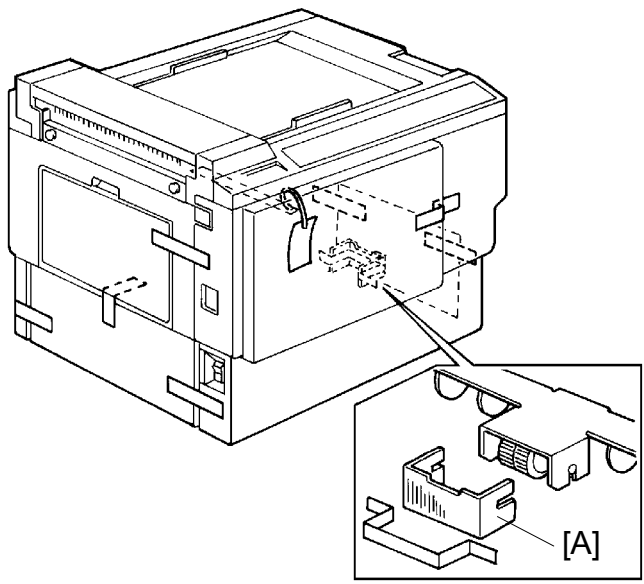

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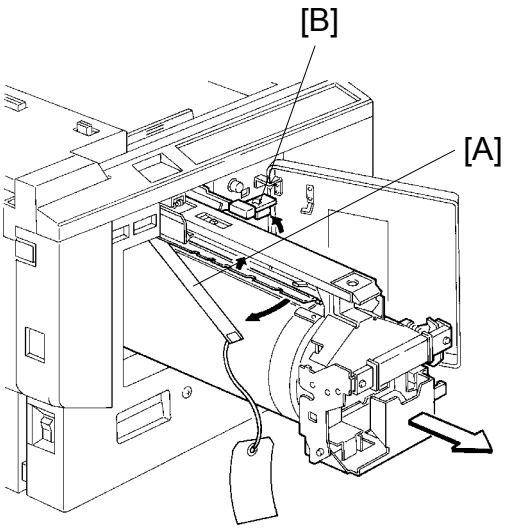
2. Mount the machine on the optional table (2 screws packed with the table).

3. Remove the strips of tape securing the covers and units as shown on the right.
   a. Open the paper feed tray. Then remove the cushion plate [A] from the paper feed roller section.
   b. Open the master delivery unit. Then remove the tape securing the paper delivery guide plate.

4. Remove the protective sheet [A] from the drum unit.
   a. Open the front door.
   b. Take out the drum unit.
   c. Remove the protective sheet from the master clamper.
   d. Reinstall the drum unit in the machine.
   e. Push down the drum lock lever [B].



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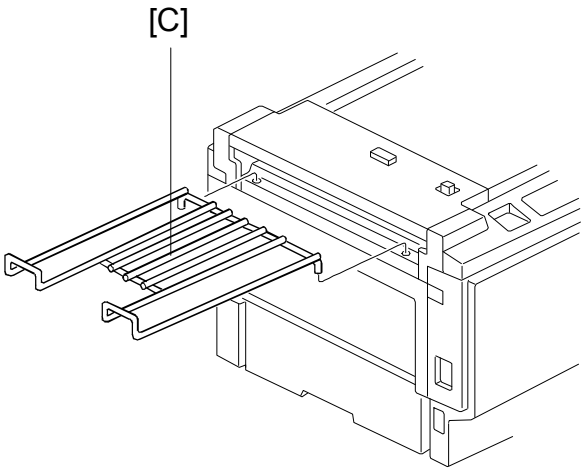
5. Install the original exit tray [C].



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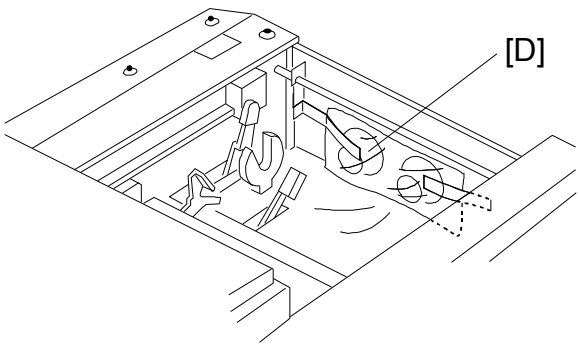
6. Slide the scanner unit all the way to the left, and take the master spools [D] out.



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7. Loading Paper on the Paper Feed Table

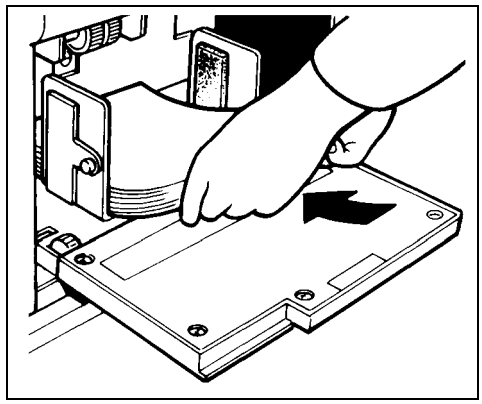
   a. Open the paper feed table.

   b. Stack the paper neatly on the paper feed table.

   c. Position the paper feed side plates so that they lightly contact the paper on both sides.

   d. Position the paper delivery table for the printing paper size, using the scale on the table.

   e. Position the paper delivery side plate for the printing paper size, using the scale on the table.



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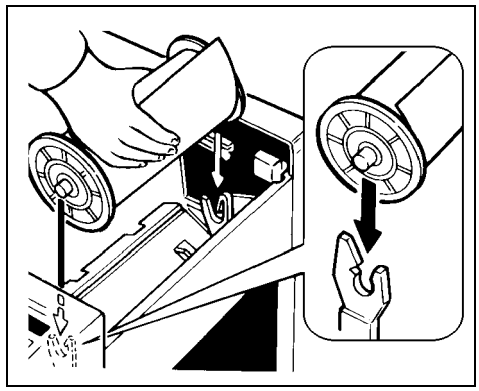
8. Installing the Master Roll (Type VT-II-M)

   a. While lifting the release lever, slide the scanner unit to the left.

   b. Attach a spool to each end of the master roll.

   c. Set the master roll in the machine.

   NOTE: The vinyl side faces down.



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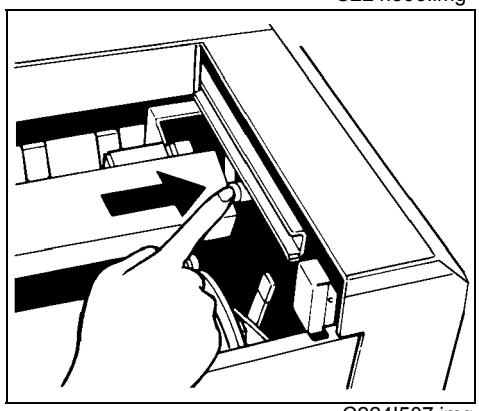
   d. Return the pressure release lever to the original position.

   e. Plug in the power cord and turn on the main switch.

   f. Press the Master Cut button.



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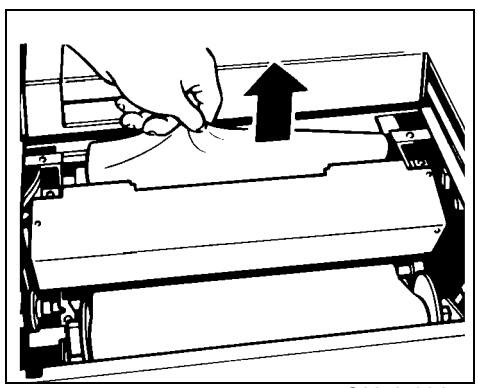
   g. Remove the cut master paper.

   NOTE: Check that the master paper is not bent or creased.

   h. Close the scanner unit.



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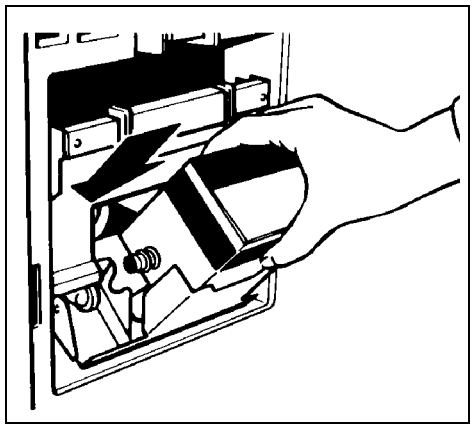
9. Installing the Ink Cartridge

   a. Open the front door and lower the ink holder.

   b. Remove the ink cartridge cap.

   c. Insert the ink cartridge into the ink holder and return the ink holder to the original position.

   d. Close the front door.

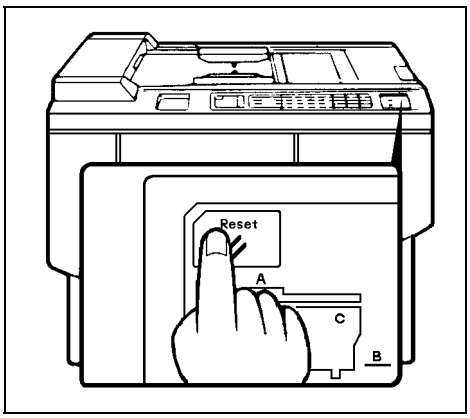


C224I509.img

10. Idling

   a. While holding down the "0" key on the operation panel, press the Reset key.

   b. If [ ] + D blinks on the operation panel, repeat the above procedure.



C224I510.img

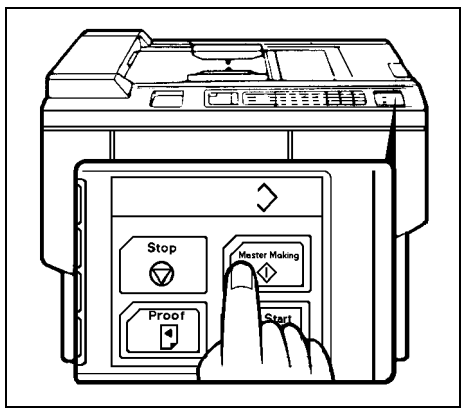
11. Test Printing

   a. Adjust the original guide to match the original size.

   b. Place an original face down.

   c. Input the desired number of prints with the number keys and press the Master Making key.

   NOTE: With a new machine, the master paper misfeed indicator [ ] + F blinks because there is no master yet on the drum. Press the Reset key, then press the Master Making key.



C224I511.img

   d. After one sheet of paper is delivered, make prints at the lowest print speed (1) until the print image density stabilizes. Use a test chart to check for changes in the image density.

   e. Check the copy quality after the image is stabilized.

SECTION 4

SERVICE TABLES

1. MAINTENANCE TABLES

1.1 LUBRICATION POINTS

Lubricate after removing adhering ink and paper dust.

Lubrication Point	Interval	Type
Bearings for the drum drive shaft	Yearly	Oil
Bearing for each cam shaft	Yearly	Oil
Bearing for the main motor shaft	Yearly	Oil
Bearing for the speed reduction shaft	Yearly	Oil
Gears on the drum drive shaft	Yearly	Grease
Gears for each cam	Yearly	Grease
Paper feed sector gear	Yearly	Grease
Second feed sector gear	Yearly	Grease
Edge of each cam	Yearly	Grease
Master pressure plate groove	Yearly	Grease

Type of Oil and Grease

Oil: Motor Oil (SAE No.20)
Grease: Shell Albania No.2

1.2 USER'S MAINTENANCE

Please advise the customer to clean each item at suitable intervals.

Cleaning Point	Interval	Cleaner
Original platen cover	At any time	Cloth and water
Exposure glass	At any time	Cloth and glass cleaner
Paper feed rollers	At any time	Cloth, and soap and water (or alcohol)
Press roller	At any time	Cloth, and soap and water (or alcohol)

1.3 PERIODIC INSPECTION TABLE (EVERY 6 MONTHS)

Item/Location	Step	Inspection Standard
Original platen cover	Cleaning	Wipe off any stains with a soft cloth dampened with ethyl alcohol.
Exposure glass	Cleaning	Wipe with a dry cloth.
Mirror/Sub mirror	Cleaning	Use a blower brush.
Platen roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Sensors	Inspection and cleaning	Check the performance of all the sensors. Remove stains from sensors with dry cloth.
Press roller	Cleaning	Wipe off the ink and paper powder with cloth dampened with ethyl alcohol.
Drum surface	Cleaning	Wipe off the paper powder and ink which is forced out from the trailing edges of the masters using a cloth dampened with ethyl alcohol.
Master feed and delivery	Inspection	The master should be properly fed and clamped, without generation of skew, folding, etc. The master should also be properly delivered without jam.
Paper feed and delivery	Inspection	Print a few sheets to ensure that paper is smoothly fed and delivered, without generation of skew, folds, wrinkles, etc.
Second paper feed rollers	Cleaning	Wipe off ink and paper powder with a cloth dampened with alcohol.
Original transport rollers	Cleaning	Wipe off paper powder with a cloth dampened with water.
ADF		
Pull-out roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Original feed roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Separation blade	Cleaning	Wipe off paper powder with a cloth dampened with water.

1.4 TABLE OF PERIODIC INSPECTION (EVERY 12 MONTHS)

Item/Location	Step	Inspection Standard
Original platen cover	Cleaning	Wipe off stains with a soft cloth dampened with ethyl alcohol.
Exposure glass	Cleaning	Wipe off stains with a soft cloth dampened with ethyl alcohol.
Fluorescent lamp	Cleaning	Wipe with a dry cloth.
Mirror/Sub mirror	Cleaning	Use a blower brush.
Platen roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Paper feed roller	Cleaning	Wipe off paper powder with a cloth dampened with water and wipe off ink with a cloth dampened with ethyl alcohol.
Separation roller	Cleaning	Wipe off paper powder with a cloth dampened with water and wipe off ink with a cloth dampened with ethyl alcohol.
Sensors	Inspection and cleaning	Check the performance of all the sensors. Wipe off stains on the sensor with a dry cloth.
Master delivery rollers	Cleaning	Wipe off built up ink and paper powder on the master delivery rollers using a cloth dampened with ethyl alcohol.
Master delivery belts	Cleaning	Wipe off built up ink and paper powder on the master delivery belts using a cloth dampened with ethyl alcohol.
Second paper feed rollers	Cleaning	Wipe off built up ink and paper powder on the second feed rollers using a cloth dampened with ethyl alcohol.
Press roller	Cleaning	Wipe off built up ink and paper powder on the press roller using a cloth dampened with ethyl alcohol.
Drum surface	Cleaning	Wipe off the ink, which is forced out from the trailing edges of masters, and paper powder using a cloth dampened with ethyl alcohol.
Master feed and delivery	Inspection	The master should be properly fed and clamped without generation of skew, folds, etc. The master should also be properly delivered without jam.
Paper feed and delivery	Inspection	Print a few sheets to ensure that paper is smoothly fed and delivered without generation of skew, folds, wrinkles, etc.
Original transport roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Lubrication points	Lubrication	Lubricate the lubrication points in the lubrication points list.

Item/Location	Step	Inspection Standard
ADF		
Pull-out roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Original feed roller	Cleaning	Wipe off paper powder with a cloth dampened with water.
Separation blade	Cleaning	Wipe off paper powder with a cloth dampened with water.

1.5 EXPECTED LIFE OF PARTS

NOTE: The main parts have the following expected life.

Target Copy Volume Range: Avg. 50,000 prints/month.
(Max. 100,000~Min. 20,000 prints/month)
Avg. 500 masters/month

Section	Part Description	Expected Life
Scanner Unit	Fluorescent lamp Original transport rollers	15,000 masters 1 year or 6,000 masters
Master Feed Unit	Thermal head Cutter Upper master feed rollers Platen roller	30,000 masters 30,000 masters 1 year or 6,000 masters 30,000 masters
Drum Unit	Cloth screen	2 years or 1,200,000 prints
Paper Feed Unit	Paper feed rubber side plate Paper feed roller Upper separation roller Separation plate Lower separation roller Feed roller brake	1,200,000 prints 6 months or 300,000 prints 600,000 prints 2,000,000 prints 1,000,000 prints
Printing Unit	Press roller	2 years or 1,200,000 prints
Delivery Unit	Vacuum belts	2 years or 1,200,000 prints
ADF Unit	Pull-out roller Original feed roller Separation blade Original pressure plate	60,000 sheets 60,000 sheets 60,000 sheets 60,000 sheets

1.6 SPECIAL TOOLS

Description	Parts Number
Test chart	99992131
Resolution chart	A0129110
Drum gauge	C2009001
Image shifting gauge	C2009002

2. TABLE OF SERVICE CALL INDICATIONS

Indication	Trouble	Possible cuses
E 01	Malfunction in the cutter section: The cutter does not reach both right and left cutter position switches within 2 seconds.	1) Drive wire cut 2) Drive section malfunction 3) No power supply
E 02	Malfunction in the paper table drive section: The lower limit sensor or the paper table height sensor status does not change even though the paper table Up or Down signal is applied.	1) Drive worm gear broken 2) Mounting screw of the worm gear broken 3) No power supply
E 04	The temperature of the thermal head or the power supply unit is high: The temperature of the thermal head becomes greater than 53°C.	1) Defective thermistor 2) Defective thermal head 3) Defective power supply unit
E 05	Malfunction in the image shifting section: All the encoder output signals are at the "H" level.	1) Encoder connector of the image shifting section is disconnected. 2) Defective encoder
E 06	Mechanical lock: The drum rotation sensor detects that the drum rotation speed is abnormal.	1) Mechanical lock 2) Main motor failure
E 09	Malfunction of the thermal head.	1) Defective thermal head 2) Defective thermistor 3) Thermal head harness broken
E-10	Malfunction in the thermal head drive section.	1) Defective main control PCB 2) Thermal head drive wire short circuit
E-11	Image shift motor malfunction: The encoder status does not change within 3 seconds after the encoder motor starts rotating.	1) Image shift motor lock 2) Image shift motor harness broken
E-12	Malfunction in the pressure plate drive section: The loner pressure plate sensor is not actuated within 8 seconds. The upper pressure plate sensor is not actuated within 4 seconds.	1) Pressure plate motor lock 2) Pressure plate motor harness broken 3) Pressure plate position sensor malfunction

3. DIP SW, LED, VR, AND TP TABLES

3.1 DIP SW TABLE (ON THE MAIN BOARD)

No.	DIP SW	Function	Remarks	Factory Setting
1	DPS101	Not Used		OFF
2	DPS102-1	Thermal Head Test	Turn off to access test pattern mode. (Refer to the Thermal Head Test section.)	ON
3	DPS102-2	Dither Matrix Selection	Turn off to select the 6 x 6 dither matrix. (Image will be lighter if the 6 x 6 dither matrix is selected.) ON: 4 x 4 OFF: 6 x 6	ON
4	DPS103-1 DPS103-2	Skip Paper Feed Setting	Select the number of drum rotation for every print when the Skip Paper Feed mode is selected. (See the skip paper setting table on the next page.)	DPS103-1: OFF DPS103-2: OFF
5	DPS103-3	Initial Full Master Check	If this switch is on, when the main switch is turned on, masters in the master eject box are compressed once to check if the master eject box is full.	OFF
6	DPS103-4	Initial Print	ON: Make two prints after making a master. OFF: Make one print after making a master.	OFF
7	DPS103-5	Beeper ON/OFF	Turn on to sound the beeper.	OFF
8	DPS103-6	Security Function	If this switch is on, prints cannot be made without making a new master after turning the main switch off and on.	OFF
9	DPS103-7	Key Counter	Turn on when installing the key counter.	OFF
10	DPS103-8	On Line	Turn on when installing the option controller.	OFF
11	DPS104-1 DPS104-2 DPS104-3	Reduction Ratio Compensation	Used to adjust the reduction ratio in the sub-scan direction. (Refer to Image Magnification in the Sub-Scan Direction Adjustment.)	
12	DPS104-4	Not Used		OFF
13	DPS104-5	Not Used		OFF
14	DPS104-6	Auto Class	If this switch is on, in Memory/Class mode, the next job starts 5 seconds after the previous job is finished even if the tape marker is not installed.	OFF
15	DPS104-7	Reduction Ratio Selection	Select the reduction ratio setting. ON: 93%, 75%, 64%. OFF: 93%, 82%, 71%.	A4 version: OFF LT version: ON
16	DPS104-8	Class/Memory Selection	Select class or memory function. ON: Memory OFF: Class	ON

Skip Paper Setting Table

	1 Sheet/ 2 Rotations	1 Sheet/ 3 Rotations	1 Sheet/ 5 Rotations	1 Sheet/ 8 Rotations
DPS103-1	OFF	ON	OFF	ON
DPS103-2	OFF	OFF	ON	ON

Skip paper setting can also be changed by key operation.

Press a number key while pressing the skip paper feed key to select the number of rotations per print.

3.2 LED TABLE

No.	LED	Function	Remarks
1	LED101 (MSPD)	Main Motor ON	When the main motor turns on, the LED lights.
2	LED102 (PDLV)	2nd Paper Exit SN	When paper is detected, the LED lights.
3	LED103 (ROLL)	1st Paper Exit SN	When paper is detected, the LED lights.
4	LED104 (MDLV)	Master Eject SN	When a master is detected, the LED lights.
5	LED105 (INK)	Ink Detection	When ink is detected, the LED lights. NOTE: When the drum release lever is raised, the drum connector is disconnected and the the LED turns off.

3.3 VR TABLE

No.	VR	Function
1	VR101 (MSPD)	Main motor speed adjustment.
2	VR102 (PDLV)	2nd paper exit sensor adjustment.
3	VR103 (ROLL)	1st paper exit sensor adjustment.
4	VR104 (MDLV)	Master eject sensor adjustment.

3.4 TEST PIN TABLE (Main Control PCB)

No.	Test Pin	Function
1	TP101 (DPLS)	Drum rotation sensor output.
2	TP102 (PDLV)	2nd drum position sensor output.
3	TP103 (ROLL)	1st drum position sensor output.
4	TP104 (MDLV)	Master eject sensor output.
5	TP105 (INK)	Ink detection signal.
6	TP106 (GND)	GND.
7	TP107 (GND)	GND.

3.5 TEST PIN TABLE (A/D Conversion PCB)

No.	Test Pin	Function
1	TP600	GND.
2	TP601	Shift signal output (SH).
3	TP602	CCD output (OS).
4	TP603	Inverted and amplified CCD output.
5	TP604	Black level standard voltage output.

4. SERVICE PROGRAM TABLE

4.1 HOW TO ACCESS I/O CHECK MODE

1. Turn on the main switch while holding down the Print Start key, Stop key, and Clear key.
2. Press the Memory/Class key to select either "Input" or "Output".
   Memory indicator "1" Input
   Memory Indicator "0" Output

4.2 INPUT CHECK MODE

Counter Indication	Component to be checked
1-1	ADF Safety Switch
2-2	1st Original Sensor
3-1	2nd Original Sensor
4-1	Original Registration
5-1	Paper End Sensor
6-1	Paper Table Lower Limit Sensor
7-1	Paper Height Sensor
8-1	Right Cutter Switch
9-1	Left Cutter Switch
10-1	Master Buckle Sensor
11-1	Master End Sensor
12-1	Ink Detection
13-1	Color Drum
14-1	Drum Safety Sensor
15-1	Master Eject Sensor
16-1	Upper Pressure Plate Sensor
17-1	Lower Pressure Plate Sensor
18-1	Master Eject Box Switch
19-1	Full Master Box Sensor
20-1	1st Paper Exit Sensor
21-1	2nd Paper Exit Sensor
22-1	Printing Pressure Sensor
23-1	1st Drum Position Sensor
24-1	2nd Drum Position Sensor
25-1	Master Cut Position Sensor
26-1	Key Counter Set
27-1	Not Used

4.3 OUTPUT CHECK MODE

Counter Indication	Output
1-0	ADF Motor is energized.
2-0	ADF Original Pressure Solenoid is energized.
3-0	Master Eject Motor is energized.
4-0	Pressure Plate Motor is energized.
5-0	Reverse Roller Clutch is energized.
6-0	Vacuum Fan Motor is energized.
7-0	Air Knife Motor is energized.
8-0	Key Counter counts up.
9-0	Master Counter counts up.
10-0	Total Counter counts up.
11-0	Ink Supply Solenoid is energized.
12-0	Drum Lock Solenoid is energized.
13-0	Printing Pressure Solenoid is energized.
14-0	Paper Feed Solenoid is energized.
15-0	Master Feed Clamper Solenoid is energized.
16-0	Master Eject Clamper Solenoid is energized.
17-0	Master Eject Solenoid is energized.
18-0	Paper Table Drive Motor is energized to moves the paper table down.
19-0	Paper Table Drive Motor is energized to moves the paper table up.
20-0	Relay for main motor reversing is energized.
21-0	Lamp is energized.
22-0	Cutter Motor is energized to move the cutter unit from front to rear.
23-0	Cutter Motor is energized to move the cutter unit from rear to front
24-0	Image Shifting Motor rotates in the (+) direction.
25-0	Image Shifting Motor rotates in the (-) direction.
26-0	Drum rotates at 10rpm.
27-0	Drum rotates at 20rpm.
28-0	Drum rotates at 60rpm.
29-0	Drum rotates at 75rpm.
30-0	Drum rotates at 90rpm.
31-0	Drum rotates at 105rpm.
32-0	Drum rotates at 120pm.
33-0	Original Transport Motor is energized.
34-0	Master Feed Motor is energized.
35-0	Thermal Head Energy is applied.
36-0	All the operation panel indicators are turned on.
37-0	Tape Maker (option) feeds out strips of paper.
38-0	Printing operation is done at 10rpm.
39-0	Simulates original transportation in ADF mode.

NOTE: 1. If the drum is rotated using output check mode 26-0 to 32-0, the drum rotation speed (rpm) is displayed in the copy counter.

2. After selecting output check mode 35-0 and pressing the Print Start key, the thermal head voltage is continuously applied until the Stop key or the Clear key is pressed. The beeper sounds while the thermal head energy is applied. Do not apply thermal head voltage for a long time.

4.4 THERMAL HEAD TEST

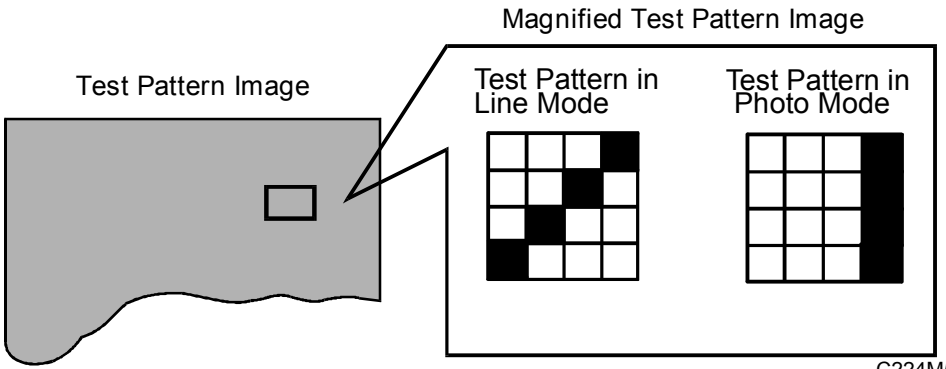
The purpose of this mode is to distinguish whether the cause of the image problem is located before or after image processing.

Output image: The normal output of this test pattern image mode is one of the dither matrix patterns as illustrated below.

Master processing length:

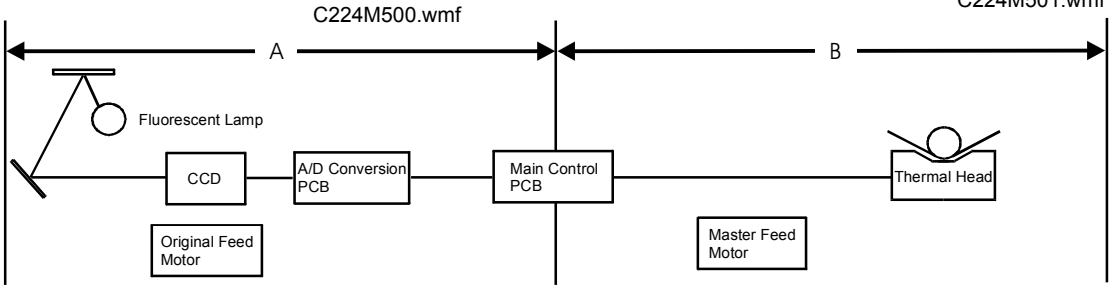
Main scan (Horizontal) direction: Full width of the thermal head

Sub-scan (Vertical) direction: Same as the vertical size of the original set on the original table.



C224M501.wmf

C224M500.wmf



This test pattern is generated by the image processing PCB.

C224M502.wmf

[Example] Problem: Vertical white lines appear on the print.

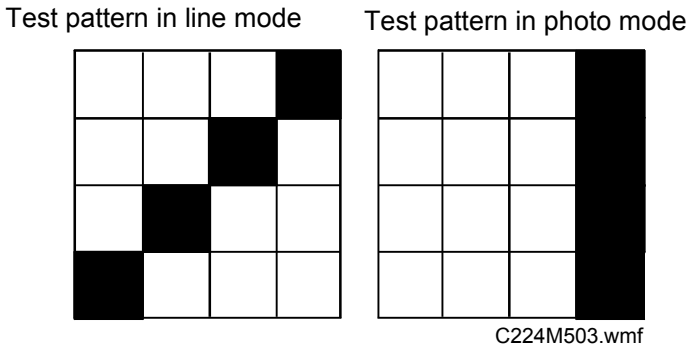
Possible Cause 1 If the same problem appears on the output image from the thermal head in test pattern image mode, the cause should be in area B, as shown above.

Possible Cause 2 If the output image from the thermal head is correct in test pattern mode but the output image in the normal mode is incorrect, the cause should be in area A, as shown above.

Service Tables

4.4.1 OPERATION: (To Enter Test Pattern Image Mode)

1) Remove the front cover.
2) Turn off DIP SW102-1 only when the power switch is off.
3) Turn on the main switch.
4) Press the Image Mode key to select the test pattern image.



5) Place an original on the original table.

⌶CAUTION:
To prevent overheating of the thermal head, make the original as short as possible. Any type of original is suitable as the test pattern being used is in the image processing PCB memory.

6) Press the Master Making key and make prints.
7) After completion of the test pattern image mode, turn on DIP SW 102-1.

5. AVAILABLE OPTION/SUPPLY TABLE

O: Standard combination
Δ: Usable under certain conditions
X: Cannot be used

Masters	Type 800	X
	Type 900	X
	VT-S	X
	VT-M	X *NOTE1
	VT-L	X
	VT-II-M	O
Inks	Black	O
	Color	O
	VT-Black-1000	X
Color Drums	Color Drum	Δ *NOTE2
	Color Drum Type 905	Δ *NOTE2
	Color Drum VT2000-M	O
	Color Drum VT2000-LG	X *NOTE3
	Color Drum VT2000-S	X *NOTE3
	Color Drum VT3000-L	X
	Color Drum VT3000-S	X
Others	Cassette B4	X
	Cassette VT3000-L	X
	Cassette VT3000-S	X
	Tape Marker Type 20	O
	Priport Table	O
	Priport Table VT3000	X

NOTE: 1. The VT-M master can be installed in the C224 model, however, a weak image (sometimes blank) will appear.
This is because the VT-II-M master is more sensitive than the VT-M master.

2. The modified master clamper (P/N C2074948) must be installed.

3. The drum can be installed. However, the maximum image area is limited depending on the drum screen size.

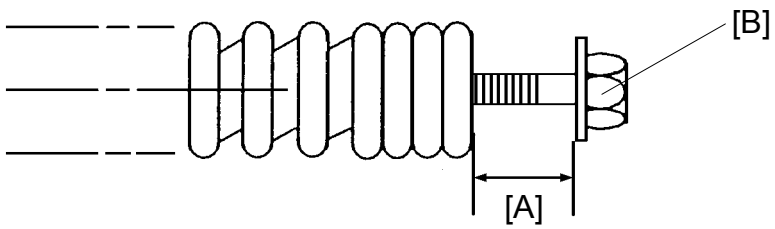
SECTION 5

REPLACEMENT AND ADJUSTMENT

1) The replacement and adjustment procedures not mentioned in the following pages are identical to those of the C211, C212 and C213 models.

2) The purpose and procedure of the following adjustments are identical to those of the C211, C212 and C213 models, however the adjustment value or VR number is different.

- PRINTING PRESSURE ADJUSTMENT



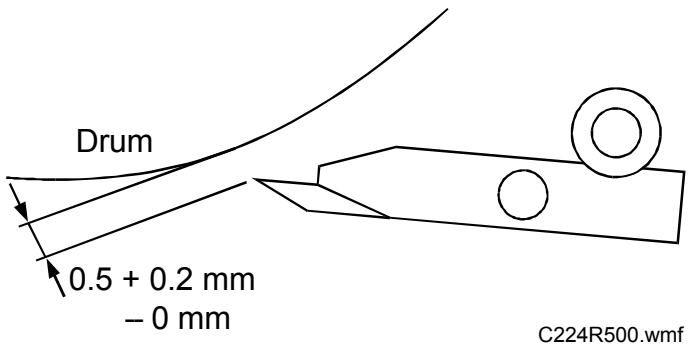
C224R511.img

Adjust the clearance [A] to be 14 ± 0.5 mm by turning the adjustment bolt [B].

- PRINTING SPEED ADJUSTMENT

Adjust the drum speed by turning VR101 on the main board.

- EXIT PAWL CLEARANCE ADJUSTMENT



C224R500.wmf

Adjust the exit pawl clearance so that the distance between the exit pawl and the drum is between 0.5 and 0.7 mm.

- FIRST PAPER EXIT SENSOR ADJUSTMENT

Adjust the 1st paper exit sensor sensitivity by turning VR103. Check the sensor status with LED103.

- SECOND PAPER EXIT SENSOR ADJUSTMENT

Adjust the 2nd paper exit sensor sensitivity by turning VR102. Check the sensor status with LED102.

1. OPTICS ADJUSTMENT

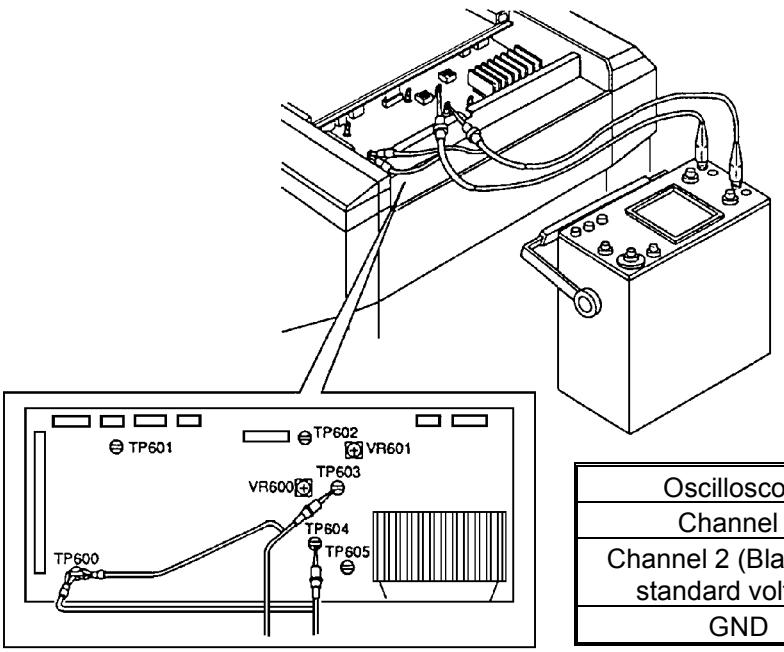
The method of the optics adjustment is the same as the C211, C212 and C213 models. However, the wave shape is not exactly the same because the pixel density of the C224 model is different from that of the C211, C212 and C213 models.

Necessary Tools

1) Facsimile Text Chart R-21 (99992131)
2) Resolution Chart (A0129110)
3) Oscilloscope

1.1 PREPARATION FOR ADJUSTMENT

1. Remove the original table and the original table cover.
2. Connect the terminals of the oscilloscope to the following test pins on the A/D conversion board.

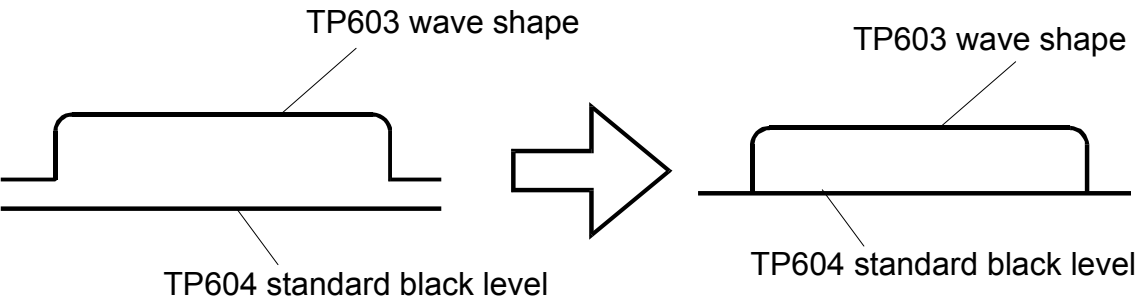


Oscilloscope	Text Pin
Channel 1	TP603
Channel 2 (Black level standard voltage)	TP604
GND	TP600

C224R515.img

3. Access "I/O Check Mode".
   - Turn on the main switch while holding the Print Start key, Stop key and Clear key on the operation panel.
4. Set "21" in the copy counter using the number keys, and set "0" in the memory/class display by pressing the memory/class key
5. Press the Print Start key to turn on the fluorescent lamp.

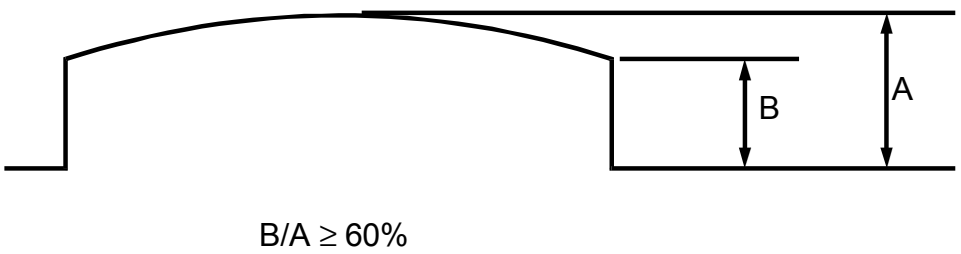
1.2 BLACK LEVEL ADJUSTMENT



C24R506.wmf

Adjust VR601 so that the black level at TP603 is the same as the standard black level (1.4 V±0.03 V).

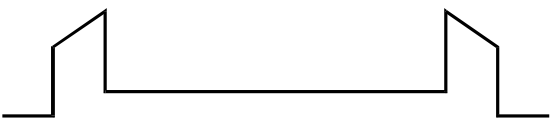
1.3 SHADING ADJUSTMENT



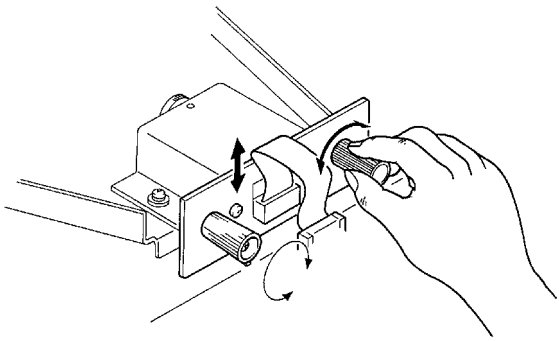
C224R505.wmf

Adjust the shading plate position so that the wave is shaped as shown above.

1.4 SCAN LINE POSITION ADJUSTMENT



C224R501.wmf

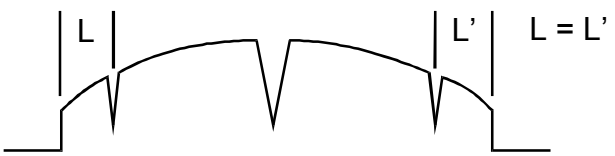


C224R509.img

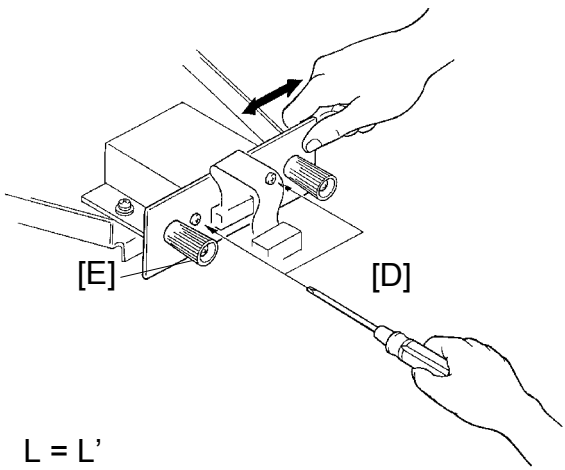
Set the R-21 test chart so that the 1 mm black line is positioned 16 mm away from the edge of the lower original guide plate.

Adjust the CCD board position so that the shape of the wave is similar to the above illustration.

1.5 READING START POSITION ADJUSTMENT (In The Main Scan Direction)



C224R502.wmf

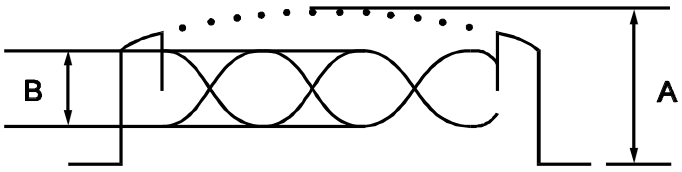


C224R514.img

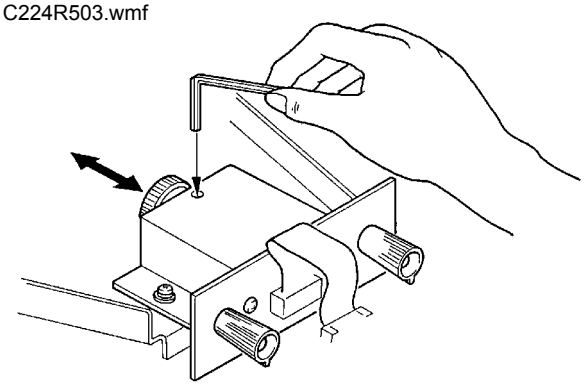
Set the test chart so that the center line, located at the leading edge of the test chart, is positioned above the original leading edge sensor actuator. Then feed the test chart so that the center line can be read.

Adjust the CCD board position so that the above wave is displayed.

1.6 FOCUS ADJUSTMENT



C224R503.wmf

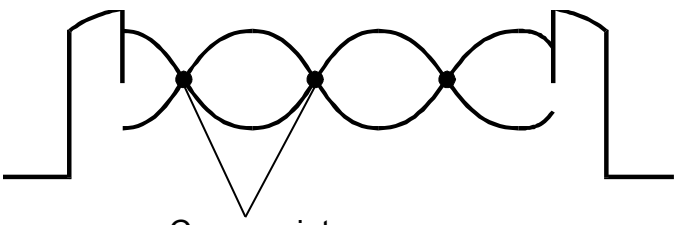


C224R508.img

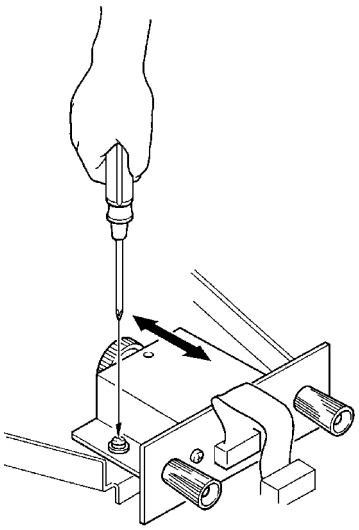
- $\frac{B}{A} \times 100 \geq 20\%$
- Amplitude "B" (difference between white and black levels) must be a maximum.

Position the resolution chart so that the 300 DPI section can be read. Adjust the lens position so that the above wave appears.

1.7 REDUCTION RATIO ADJUSTMENT



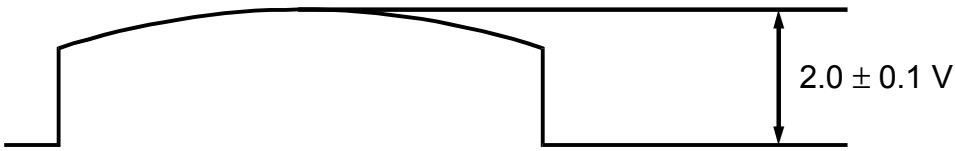
C224R504.wmf



C224R513.img

Position the resolution chart so that the 300 DPI section can be read. Adjust the lens block position so that the cross points are fewer than 8.

1.8 WHITE LEVEL ADJUSTMENT



C224R507.wmf

Adjust VR600 on the AD conversion board so that the maximum level is 2.0 ± 0.1 V.

1.9 IMAGE MAGNIFICATION IN THE SUB-SCAN DIRECTION ADJUSTMENT

Adjust the magnification ratio in the sub-scan direction using DIP103-1, 2, 3 on the main board, so that the printed image length is 100% ± 0.5% compared with the original image length.

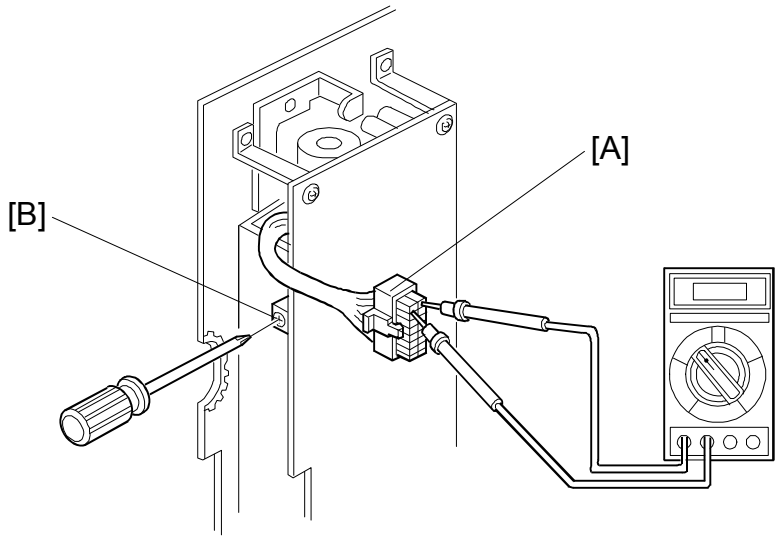
–DIP SW/Correction Ratio –

DPS 104			$\frac{\text{Original Length}}{\text{Print Image Length}} \times 100$
1	2	3	
OFF	OFF	OFF	100%
OFF	ON	OFF	99.5%
OFF	OFF	ON	99.0%
OFF	ON	ON	98.5%
ON	OFF	OFF	100%
ON	ON	OFF	100.5%
ON	OFF	ON	101.0%
ON	ON	ON	101.5%

2. THERMAL HEAD VOLTAGE ADJUSTMENT

Purpose: To maintain master making quality and extend the lifetime of the thermal head.

NOTE: This adjustment is always required when the thermal head or power supply board is replaced.

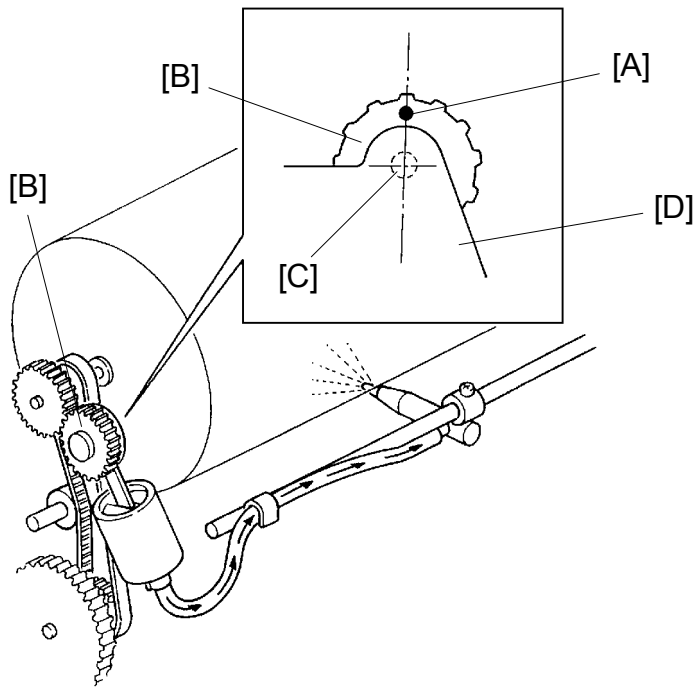


C224R512.wmf

1. Remove the rear cover and the right cover and right cover of the machine.
2. Disconnect the connector [A] from the plotter unit.
3. Check the voltage noted on the decal, located on the thermal head. (The voltage varies with each thermal head.)
4. Access "I/ Check Mode".
   - Turn on the main switch while holding the Print Start, Stop and Clear keys.
5. Input 35 in the copy counter using the number keys, and set "0" in the Memory/Class display by pressing the Memory/Class key.
6. Press the Print Start key to apply the thermal head voltage.
7. Confirm that the voltage between one of the VHD terminals and one of the ground terminals of CN503 is at the level specified on the decal (Within + 0 V ,– 0.1 V).
8. If it is not, adjust VR3 on the power supply board.

   NOTE: Press the stop key to stop applying the thermal head voltage. Do not keep the thermal head voltage on for a long period.

3. AIR PUMP TIMING ADJUSTMENT

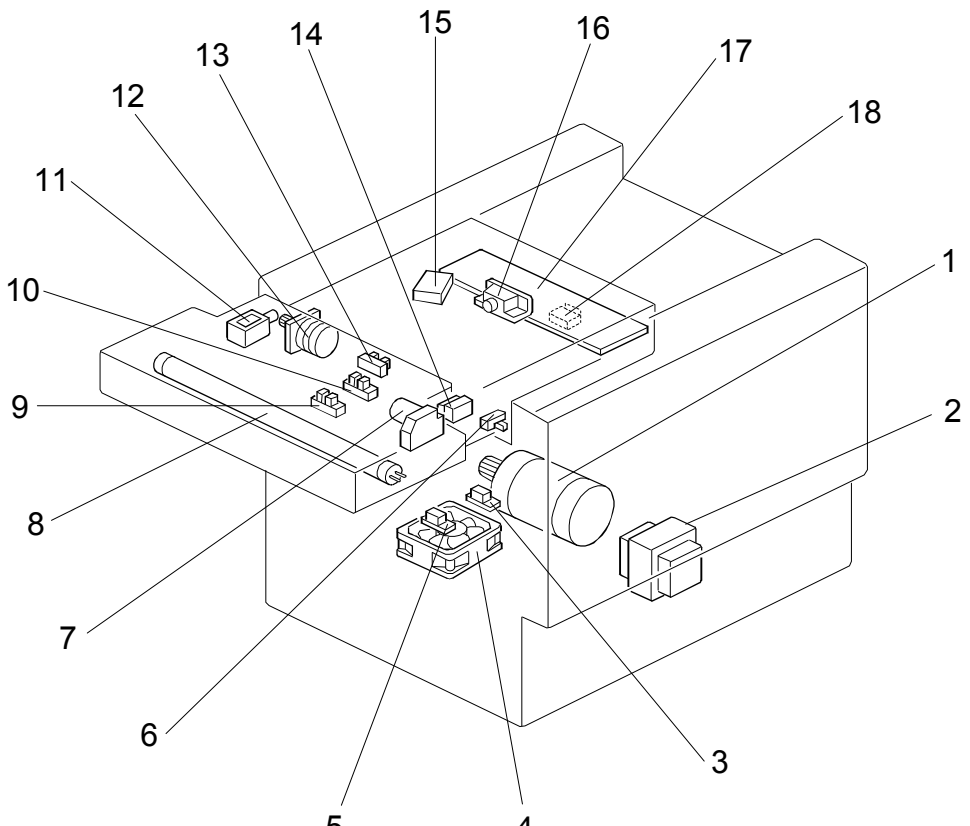


C224R510.img

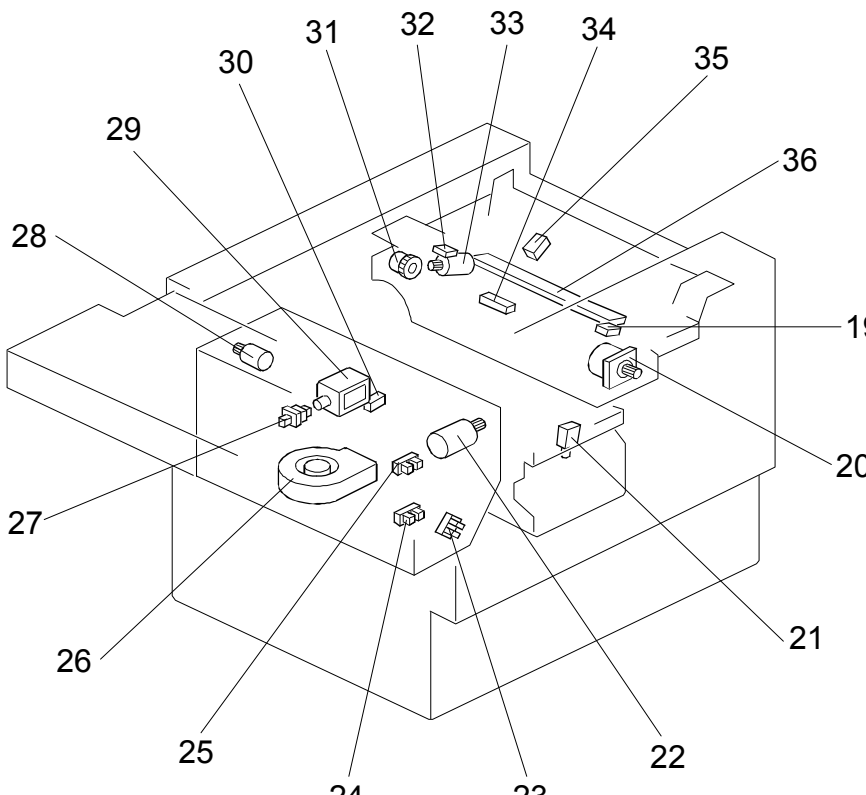
Purpose: To ensure that the paper exit pawl air pump produces a jet of air at the proper time.

1. Remove the rear cover.
2. Set the drum in the home position.
3. Confirm that the mark [A] on the pump drive gear [B] is right over the gear shaft [C].
4. If incorrect, remove the support plate [D] (5 screws) and reposition the gear.
5. Rotate the drum to the home position and do step 3 again.

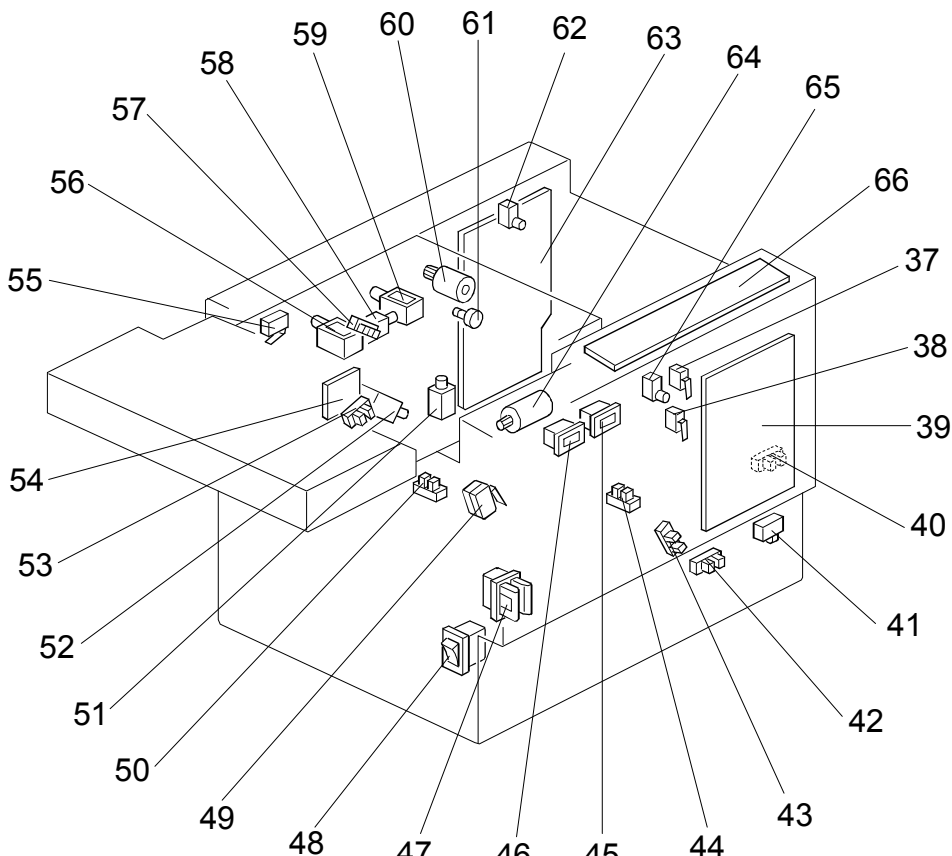
ELECTRICAL COMPONENT LAYOUT



C224S500.wmf



C224S501.wmf



C224S502.wmf

ELECTRICAL COMPONENT DESCRIPTIONS

INDEX No.	NAME	P to P LOCATION
Motors		
1	Main Motor	A-7
4	Vacuum Motor	B-16
7	ADF Drive Motor	J-7
12	Original Transport Motor	J-8
20	Master Feed Motor	D-5
22	Pressure Plate Motor	B-10
26	Air Knife Motor	B-10
28	Master Eject Motor	B-10
33	Cutter Motor	B-9
60	Image Shift Motor	B-15
64	Paper Table Drive Motor	A-7
Solenoids		
11	Original Pressure Solenoid	J-6
21	Ink Supply Solenoid	B-12
29	Master Eject Solenoid	B-10
51	Paper Feed Solenoid	J-12
52	Printing Pressure Solenoid	J-12
56	Master Eject Clamper Solenoid	J-13
58	Drum Lock Solenoid	B-14
59	Master Feed Clamper Solenoid	J-14
Switches		
6	Printing Density Switch	G-8
14	ADF Safety Switch	I-7
18	Fluorescent Lamp Safety Switch	I-5
19	Left Cutter Switch	B-9
27	Master Eject Box Switch	B-11
32	Right Cutter Switch	B-9
37	Front Door Safety Switch	B-7
38	Drum Safety Switch	B-8

INDEX No.	NAME	P to P LOCATION
41	Paper Table Safety Switch	A-6
47	Test Switch	B-3, B-6
48	Main Switch	A-2
49	Master Eject Unit Safety Switch (115 V machines only)	B-3
55	Master Eject Unit Safety Switch (220 V machines only)	
62	Master Cutter Switch	B-9
65	Drum Rotation Switch	B-14
Sensors		
3	1st Paper Exit Sensor	B-15
5	2nd Paper Exit Sensor	B-16
9	Original Registration Sensor	I-6
10	2nd Original Sensor	I-5
13	1st Original Sensor	I-6
23	Lower Pressure Plate Sensor	B-11
24	Full Master Box Sensor	B-11
25	Upper Pressure Plate Sensor	B-11
30	Master Eject Sensor	B-11
34	Master Buckle Sensor	B-8
35	Master End Sensor	B-9
40	Paper Table Height Sensor	J-11
42	Paper Table Lower Limit Sensor	J-11
43	Printing Pressure Sensor	J-12
44	Paper End Sensor	J-12
50	Drum Rotation Sensor	B-13
53	2nd Drum Position Sensor	B-13
57	1st Drum Position Sensor	B-13

INDEX No.	NAME	P to P LOCATION
Printer Circuit Board		
16	CCD PCB	I-3
17	A/D Conversion PCB	H-4
39	Main Control PCB	F-7
54	Ink Detection PCB	C-13
63	Power Supply PCB	G-1
Counters		
45	Copy Counter	J-13
46	Master Counter	J-13
Others		
2	Transformer	B-2
8	Fluorescent Lamp	K-4
15	Fluorescent Lamp Stabilizer	J-4
31	Reverse Roller Clutch	B-9
36	Thermal Head	C-3
61	Encoder	B-14
66	Operation Panel	I-9